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PATENT APPLICATION
Mo-7917
HE-177

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION OF	
	GROUP NO.: 1732
JÜRGEN WIRTH ET AL	
SERIAL NUMBER: 10/777,495	EXAMINER: MONICA ANNE HUSON
FILED: FEBRUARY 12, 2004	
TITLE: PROCESS FOR PRODUCING POLYURETHANE MOLDINGS	

LETTER

Mail Stop - Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 2231-1450

Sir:

Enclosed herewith is a copy of an Appeal Brief in the matter of the subject Appeal. Please charge the fee for filing the Brief, $500.00, to our Deposit Account Number 13-3848 .

Respectfully submitted

By _____
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Date
Lyndanne M. Whalen, Reg. No. 29,457
Name of applicant, assignee or Registered Representative
_____
Signature
June 19, 2007
Date

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APPEAL BRIEF

Commissioner for Patents
P. O. Box 1450
Alexandria, VA 22313-1450

Sir:

This Brief is an Appeal from the Final Action of the Examiner dated January 23, 2007 in which the rejections of Claims 1-7 were maintained.

I. REAL PARTY IN INTEREST

Each of the inventors has assigned his interest in the present application to Hennecke GmbH, a German corporation. Hennecke GmbH is therefore the real party in interest in this Appeal.

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Lyndanne M. Whalen, Reg. No. 29,457
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II. RELATED APPEALS AND INTERFERENCES

There are no prior or pending appeals, interferences or judicial proceedings which are related to, affected by or have a bearing on the Board's decision in this Appeal.

III. STATUS OF CLAIMS

Claims 1-7, all of the claims, stand rejected and are the subject of this Appeal.

No Claims have been cancelled.

No Claims have been withdrawn from consideration.

No Claims have been objected to.

No Claims have been allowed.

IV. STATUS OF AMENDMENTS

No amendments to the claims have been made or requested subsequent to the Final Action of the Examiner.

V. SUMMARY OF CLAIMED SUBJECT MATTER

The present invention is directed to a process for producing a polyurethane molding (page 4, line 4 of the specification) in which at least one isocyanate component (page 4, line 5 of the specification) and at least one polyol component (page 4, line 5 of the specification) are conveyed in shot operation (page 4, lines 4-5 of the specification) for a predetermined time-interval Δt (page 4, line 6 of the specification) into a mixing chamber (page 4, lines 6-7 of the specification; Figure 2, element **13**) at predetermined volumetric flow-rate $\dot{V}_{s/iso}$ for the isocyanate (page 4, line 7 of the specification) and $\dot{V}_{s/polyol}$ for the polyol (page 4, line 7 of the specification) and predetermined pressure $p_{s/iso}$ for the isocyanate (page 4, line 8 of the specification) and $p_{s/polyol}$ for the polyol (page 4, lines 8-9 of the

specification). The isocyanate and polyol are then mixed in the mixing chamber to form a polyurethane reaction mixture and the polyurethane reaction mixture is discharged into a mold (page 4, lines 9-10 of the specification). In this process, prior to conveyance of the polyol and isocyanate components in shot operation (page 4, line 10 of the specification), (1) the isocyanate and polyol are conveyed in circuit through circulation lines (page 4, lines 10-12 of the specification; element **3** in each of Figures 1 and 2) between the mixing chamber (page 4, lines 11-12 of the specification; Figure 2, element **13**) and their respective storage vessels (page 4, line 12 of the specification; element **4** in each of Figures 1 and 2), (2) the pressure of the isocyanate and of the polyol are measured by means of pressure sensors (page 4, lines 13-14 of the specification; element **10** in each of Figures 1 and 2) and transmitted to a control device (page 4, line 14 of the specification; element **12** in each of Figures 1 and 2), (3) the volumetric flow-rates of the isocyanate and polyol are adjusted while being conveyed through the circulation lines in such a way that the pressure of each of the isocyanate and polyol in the circuit corresponds to the predetermined pressures $p_{s/iso}$ and $p_{s/polyol}$ of the components for shot operation (page 4, lines 15-17 of the specification), and (4) the volumetric flow-rates $\dot{V}_{s/iso}$ and $\dot{V}_{s/polyol}$ of the isocyanate and polyol are adjusted by the control device during change-over from circulatory mode of operation to shot operation (page 4, lines 18-20 of the specification) by adjustment of drive units (page 4, line 21 of the specification; element **11** in Figure 2) of metering elements (page 4, line 21 of the specification; element **6** in each of Figures 1 and 2) for the isocyanate and polyol (page 4, lines 20-22 of the specification).

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

A. Claims 1 and 4-7 stand rejected under 35 U.S.C. §102(b) as being anticipated by Soechtig (U.S. Patent 4,944,599).

B. Claims 2 and 3 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Brown (U.S. Patent 5,240,969).

VII. ARGUMENTS

A. Soechtig does not disclose Appellants' claimed invention to those of ordinary skill in the art.

A key feature of the process of the present invention is the adjustment of the volumetric flow rates of the isocyanate and polyol streams during change-over from circulatory mode of operation to shot operation. This adjustment of flow rates results in maintenance of a constant pressure throughout the system during both the circulation mode and the shot operation (Compare Figures 3 and 4) and thereby avoids distortion of the mixing ratio of isocyanate and polyol.

Soechtig discloses an impingement mixing device in which constant pressure and flow volume is achieved by continuous closed feedback loop monitoring of the pressure and flow volume to effect a change in an adjustable pump setting and **servo displaceable nozzle needle**.

Soechtig does **not** teach or suggest the adjustment of volumetric flow rates while being conveyed through the circulation lines to the volumetric flow rate during shot operation as is required in Appellants' claimed invention. Rather, Soechtig teaches adjustment of the nozzle needle during the shot operation - not in circulation lines prior to shot operation.

Soechtig does not therefore disclose Appellants' claimed invention and does not therefore support the rejection of Applicants' claimed invention under 35 U.S.C. §102(b).

The Examiner has maintained that Soechtig teaches adjustment of the volumetric flow rates of the isocyanate and polyol while being conveyed through the circulation lines in such a way that the pressure of

each of the isocyanate and polyol in the circuit corresponds to the predetermined pressures of the components for shot operation at column 7, lines 5-15 and 26-30.

Appellants respectfully disagree.

At column 7, lines 5-15, Soechtig states:

> A flow meter **28** is also connected in the circulation loop prior to the mixing head. The control block **30** is connected in a closed loop. The control block monitors the pressure transducer **27** and the incremental transmitter **23** in order to actuate the servo-motor **14 to control the nozzle position**. In a similar fashion the control block also monitors flow meter **28** and the linear potentiometer **26** in order to actuate the servo valve **25** to adjust the setting piston **24** thereby setting the pump **9**. (emphasis added)

It is the control of the nozzle position by which the appropriate pressure is maintained in the Soechtig method. (See column 1, lines 54-58 of Soechtig.)

Soechtig does **not** teach or suggest that adjustment of the flow rate of the reaction components could or should be used to maintain a constant pressure. Soechtig does teach at column 1, line 65-column 2, line 4 that:

> The interaction between volume and pressure of each component further enables **changing the component mixing ratio** by affecting the pressure of only a single component or by modification of the component pressure of each component independent of the component pressure of the other components. Changing the component mixing ratio will effect the characteristics of the product produced. (emphasis added)

Appellants' invention is directed to maintaining the desired mixing ratio - not changing that ratio.

Appellants further maintain that the teachings of Soechtig at column 7, lines 26-30 do not support the rejection of the presently claimed invention because this cited portion of the reference does not teach or suggest that adjustment of the flow volume of reactants could or should be

used to maintain a constant pressure during the circulation and shot modes of operation.

The Examiner has further argued that the teaching of Soechtig in Figure 5 and at column 6, lines 62-64 and at column 7, lines 3-15 teach adjustment of volumetric flow rates during the changeover from circulation to shot operation. (at page 2, lines 3-6 of the Advisory Action)

Appellants respectfully disagree.

Soechtig does teach that an adjustable pump may be included in the circulation loop shown in Figure 5. However, Soechtig does **not** teach adjustment of flow rate to maintain pressure during shot operation. Rather, Soechtig teaches monitoring of flow rate and pressure to actuate the motor controlling nozzle position.

The significance of this difference lies in the ability of Appellants' process to maintain constant pressure during shot operation.

The Examiner has maintained that because maintenance of constant pressure is "not necessarily claimed", Appellants arguments are not persuasive. (at page 2, lines 10-11 of the Advisory Action.)

Appellants submit that inherent advantages taught in their specification to be achieved by their claimed process which requires the steps needed to achieve an advantage that was not achieved by the prior art must be considered in determining whether the teachings of the prior art anticipate the claimed invention.

In short, Soechtig monitors pressure to adjust the nozzle needle position. Soechtig does not teach or suggest a key feature of Appellant's claimed invention, i.e., the maintenance of constant pressure by volume control. Soechtig does not therefore teach or suggest Appellants' claimed invention and does not therefore support the rejection of Applicants' claimed invention under 35 U.S.C. §102(b).

B. Appellants' invention as claimed in Claims 2 and 3 is not rendered obvious to one of ordinary skill in the art by the teachings of Brown.

Brown discloses low density reinforced reaction injection molded parts. Brown does not teach or suggest anything with respect to maintaining a constant volumetric flow rate during shot operation in the process used to make such parts.

The teachings of Brown can not therefore be construed in any manner which would lead one skilled in the art to Appellants' claimed process in which the volumetric flow rates of the isocyanate and polyol components are adjusted while being conveyed through the circulation lines to make them correspond to the volumetric flow rate during shot operation.

Appellants' claimed invention is not therefore rendered obvious by the teachings of Brown.

The Examiner has maintained that Appellants' arguments are not persuasive because Brown was not cited to show maintaining a constant volumetric flow rate during shot operation.

Appellants would first point out that their invention is directed to a process in which constant pressure is maintained by control of volumetric flow rate.

Appellants would further point out that Claims 2 and 3 depend from Claim 1 which does require control of volumetric flow rate to maintain constant pressure. The fact that Brown does not teach this feature of the claimed invention is therefore significant.

C. Appellants' invention as claimed in Claims 2 and 3 is not rendered obvious by the combined teachings of Brown and Soechtig.

As has already been discussed in Section VII. A of this Brief with respect to the rejection of Claims 1 and 4-7 under 35 U.S.C. §102(b), Soechtig teaches a completely different method for controlling pressure than that used in Appellant's claimed invention. Brown teaches nothing with respect to maintenance of constant pressure during shot operation.

Combination of the teachings of Soechtig with those of Brown would not therefore render Appellants' claimed invention obvious to one skilled in the art reading those disclosures at the time Appellants made their invention.

VIII. CONCLUSION

A key feature of the process of the present invention is the adjustment of the volumetric flow rates of the isocyanate and polyol streams during change-over from circulatory mode of operation to shot operation. This adjustment of flow rates results in maintenance of constant pressure throughout the system during both the circulation mode and the shot operation and thereby avoids distortion of the mixing ratio of isocyanate and polyol.

Soechtig does not teach or suggest this key feature of Appellants' invention.

The teachings of Soechtig do not therefore anticipate Appellants' invention as claimed in Claims 1 and 4-7.

Neither Soechtig nor Brown teaches a process in which the volumetric flow rates of the isocyanate and polyol components are adjusted while being conveyed through the circulation lines to make them

correspond to the volumetric flow rate during shot operation as required in Appellants' claimed invention.

The teachings of Soechtig and Brown can not therefore be combined in any manner which would render Appellants' claimed invention obvious.

Appellants therefore maintain that each of the Examiner's rejections is in error and respectfully request that each of these rejections be reversed and that Claims 1-7 be allowed.

Respectfully submitted,

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IX. CLAIMS APPENDIX

1. A process for producing a polyurethane molding comprising:

a) conveying in shot operation at least one isocyanate component and at least one polyol component for a predetermined time-interval Δt into a mixing chamber at predetermined volumetric flow-rate $\dot{V}_{s/iso}$ for the isocyanate and $\dot{V}_{s/polyol}$ for the polyol and predetermined pressure $p_{s/iso}$ for the isocyanate and $p_{s/polyol}$ for the polyol,

b) mixing the isocyanate and polyol in the mixing chamber to form a polyurethane reaction mixture, and

c) discharging the polyurethane reaction mixture into a mold, and

in which

(1) prior to a), the isocyanate and polyol are conveyed in circuit through circulation lines between the mixing chamber and their respective storage vessels,

(2) the pressure of the isocyanate and of the polyol are measured by means of pressure sensors and transmitted to a control device,

(3) the volumetric flow-rates of the isocyanate and polyol are adjusted while being conveyed through the circulation lines in such a way that the pressure of each of the isocyanate and polyol in the circuit corresponds to the predetermined pressures $p_{s/iso}$ and $p_{s/polyol}$ of the components for shot operation, and

(4) the volumetric flow-rates $\dot{V}_{s/iso}$ and $\dot{V}_{s/polyol}$ of the isocyanate and polyol are adjusted by the control device

during change-over from circulatory mode of operation to shot operation by adjustment of drive units of metering elements for the isocyanate and polyol.

2. The process of Claim 1 in which reactive components and/or additives in addition to the polyol and isocyanate are employed.

3. The process of Claim 2 in which a dye is employed.

4. The process of Claim 1 in which the pressure of the isocyanate and of the polyol both during recirculation and during shot operation lie within a range from 3 bar to 600 bar.

5. The process of Claim 1 in which the pressure of the isocyanate and of the polyol both during recirculation and shot operation lie within a range of from 50 bar to 350 bar.

6. The process of Claim 1 in which the pressure of the isocyanate and of the polyol both during recirculation and shot operation lie within a range of from 100 bar to 250 bar.

7. The process of Claim 1 in which the volumetric flow-rate of the isocyanate and of the polyol are registered permanently by a volumetric-flow meter, the flow-rates are signalled to the control system by means of a pulse line and any flow-rate exceeding a set tolerance which arises during a shot is ascertained and corrected for subsequent shots.

X. EVIDENCE APPENDIX

None

XI. RELATED PROCEEDINGS APPENDIX

None